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A qualitative study on the perception of obesity in Nepal

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Abstract

Objective

To explore the perception of obesity and overweight among Nepalese adults living in a suburban community from both community's and health providers' perspectives.

Design

A qualitative study comprising focus group discussion and in-depth interview.

Setting

Community and health care facilities in Dhulikhel, Nepal.

Participants

Four focus group discussions were conducted with general people (n= 22) and four in-depth interviews were conducted with health providers.

Results

Obesity was a rising problem in this suburban community. People had inadequate knowledge regarding the consequences of obesity, and they perceived overweight as normal, healthy, and attractive. The adults above 40 years of age did not perceive themselves to be overweight/obese. Despite the participant's awareness of the importance of diet control and exercise to prevent obesity, these were not translated into practice. The providers at the peripheral health institutions lacked training and instruments to identify central obesity.

Conclusions

This study provided insight into the perception of obesity in the community through both community and health providers' perspective. Misconception and inadequate knowledge on obesity among people in this community indicate the need of health education and interventional program to increase health awareness and preventive practices.

Keywords: obesity, overweight, perception, qualitative study, Nepal, public health, cardiovascular disease

Strengths and limitaions of this study

- To our knowledge, this is the first study in Nepal to explore the perception of obesity among adults in a suburban community in Nepal.
- The study includes the in-depth view of both community people and health care providers working at different levels.
- The study findings may not be generalizable to other population because of small sample size and limitation to only the Dhulikhel Heart Study participants residing in suburban area.

Background

Obesity is one of the top five causes for cardiovascular mortality and morbidity in the world[1] causing increased risk of coronary artery disease, diabetes mellitus, hypertension, and kidney failure.[2] The rate of obesity has increased in many developing nations, including Nepal.[3-5] About 24.3% of Nepalese adults are obese or overweight.[6]

Several demographic, socio-economic and cultural factors contributing to obesity have been described elsewhere.[7-9] Like other developing countries, Nepal is undergoing epidemiologic and demographic transition, experiencing significant lifestyle changes. [7-10] Urbanization, leading to increased number of fast food restaurants, the growing culture of 'eating out', and availability of lower price food with high calories have contributed to obesity. The 2019 STEP survey reported low physical activity and low vegetables and fruits consumption in Nepal.[6]

Studies have found relationship between obesity and body weight/size perception. Unlike in developed countries, heavier body is preferred in developing countries like South Africa and Tanzania.[8 11] In Nepal, traditionally, 'big belly' is considered as a sign of prosperity.[7] This perceived norm might be facilitating weight gain mainly among high-income individuals and families. However, with the global epidemiologic transition and technological advancement, this perception may be changing. It is also important to understand how the individual perceives their own body size. The individuals who do not see themselves as overweight/ obese are prone to gain weight because of their low risk perception and unwillingness to lose weight.[8 11 12] On the other hand, females generally have wrong perception of their body weight as to being too high, and thus are dissatisfied with their bodies compared to males.[13]

To our understanding, there are no qualitative studies conducted to date to understand obesity perception among people in Nepal. Thus, this study aimed to explore the perception of obesity among Nepalese adults living in Dhulikhel.

METHODS

Study design and setting

This was a qualitative study under a large cohort study, the Dhulikhel Heart Study (DHS), which is a longitudinal cohort study conducted between November 2013 to February 2015 to assess the prevalence of cardiovascular diseases and its risk factors among adults of 18 years and older living in Dhulikhel, a sub-urban town in Nepal.[14]

Participants

We conducted a Focus group Discussion (FGD) with the DHS participants. We used purposeful, maximum variation sampling to include participants from different ages and gender. We stratified participants into four groups as per gender (male and female) and age (<40years and ≥40years). The separation of gender was necessary because women in Nepalese culture are usually shy and do not discuss explicitly in presence of men. We contacted 48 eligible participants via phone or home visit. Of which, 22 participated in the discussion. Six participants who initially agreed to participate did not show up in the discussion. The reason for non-participation were busy schedule on the given time and date and medical illness.

For IDIs, we purposefully selected four health providers (HPs) from different healthcare levels to explore barriers to obesity management. We selected one doctor and a nutritionist from the tertiary hospital, an in-charge from a primary health care center, and an in-charge from the urban health care center. All agreed to participate in the study.

Data collection

We collected data from October 2016 to December 2016. We developed initial guidelines in Nepali. The FGD guideline was pilot tested among 6 DHS participants, and the IDI guideline was pre-tested with a doctor in the tertiary hospital. The guidelines were then reviewed and

modified accordingly. The findings from the pre-tested FGD and IDI were not included in this analysis. The questions included 'What do you understand by obesity?', 'How do you view overweight and obesity?', 'How do you describe your body size', and 'What factors affect obesity management?'. FGD participants were offered a light snack for their time and participation.

All FGDs were moderated by the researcher and assisted by a note taker. The moderator was not from the study community, hence did not know the participants prior to the study. The moderater started each session by briefly explaining the aim of the study and receiving informed consent. The moderator started with open-ended questions and probed further for in-depth information. We conducted FGDs in a private space in a community building. The group size varied from 3 to 7. We measured participants' height and weight before discussion. The investigator conducted and in-depth interviews with health providers in the private room at their respective health care centers. Informed consent was received prior to each interview.

Data analysis

IDIs and FGDs were recorded and transcribed verbatim in Nepali. SS transcribed all recorded data. We used structural and thematic coding to analyze the data. We started with an "a priori" list of codes drawn from the literature review and then included additional themes that came up during the inductive analysis process. A second coder (SA) used the same start list and inductively coded for emerging themes. Coders discussed similarities and differences in the way codes were applied and agreed on the emerging ones. After the discussion, the codebook was updated. SS further analyzed the transcripts and grouped text units as per the codes using the Atlas ti.7. Selected quotes were reported.

Patient and public involvement

No patients or the public were involved in the conception of this study, analysis, and manuscript writing.

RESULTS

Characteristics of participants

The characteristics of the participants are presented in tables 1 and 2.

Table 1: Socio-demographic characteristics of FGD participants

Characteristics	Participants (n=22) n (%)
Age group	
20-39	10 (45.5)
40-59	10 (45.5)
>60	2 (9.0)
Gender	
Male	10 (45.5)
Female	12 (54.5)
Ethnicity	
Newar	25 (71.4)
Brahmin	5 (14.3)
Tamang	4 (11.4)
Religion	
Hindu	22(100.0)
Marital status	
Married	15 (68.2)
Not married	6 (27.3)
Widow	1 (4.5)
Education	
No formal education	3 (13.6)
Primary level education	2 (9.1)
Secondary level	6 (27.3)
High school or more	9 (40.9)
Occupation	
Employee	3 (13.6)
Self-employed*	9 (40.9)
Home makers	4 (18.2)
Unemployed	2 (9.1)
Student	4 (18.2)
BMI	
<25kg/m^2	9 (40.9%)
≥25-29kg/m^2	6 (27.3%)
≥30kg/m^2	7 (31.8%)

*Self-employed include business and agriculture

Table 2: Job title and represented institution of health providers

Job title	Institution	N
Medical Officer	Tertiary hospital	1
Nutritionist	Tertiary hospital	1
Auxillary Health Worker	Primary Health Care Center (PHCC)	1
Auxiliary Health Worker	Urban Health Care Center (UHCC)	1

We categorized themes derived from FGDs and IDIs into five categories:: (1) Burden of obesity; (2) Knowledge on obesity; (3) Attitude towards obesity; (4) Body size perception; and (5) Barriers to obesity management. The example of coding, categorizing, and formulating themes is given in table 3.

Table 3: Example of coding, categorizing, and formulating themes

Codes	Definition of codes	Subcategory	Category	Theme
Busy Schedule	Any reference to discontinuing or not initiating exercise due to patient's lack of time.	Exercise habit	Challenges in behavior modification	Barriers to weight management
Laziness	Any reference to discontinuing or not initiating exercise due to patient's laziness.			
Co-morbidities	Any reference to discontinuing or not initiating exercise due to patient's existing disease/condition.			
Weather	Any reference to discontinuing or not initiating exercise due to weather condition.			
Lack of physical facilities	Any reference to discontinuing or not initiating exercise due to lack of physical facilities and adequate space to exercise.			
Food taste	Any reference to difficulty in modifying dietary habit due to food taste.	Food habit		

Desire to eat	Any reference to difficulty in modifying dietary habit due to patient's desire to eat what they see.
Junk food	Any reference to difficulty in modifying dietary habit due to easy availability and accessibility of junk food.
Lack of access to healthy food	Any reference to difficulty in modifying dietary habit due to inaccessibility of healthy food.

Burden of obesity

Both FGD participants and HPs identified obesity as a growing problem in the community. A medical officer stated that among 20-25 patients he examines in a day, 7-8 of them are either overweight or obese. He further commented that obesity might have been increasing in teenagers, but these teenagers are not under their radar as they do not usually visit doctors. Obesity was found to be higher among females and individual aged 40 years and over in the community. Participants also pointed out that obesity is high among few ethnic groups like, Newar and Tamang, married persons, office workers, housewives, businessmen, drivers, rich people, and people living in urban areas.

> *"In Newari culture, there is a lot of feasts and festivals, so they eat a lot. In case of Tamang, they drink (alcohol) a lot. They eat much while drinking. Both are high in calorie, so this might result in weight gain."* (Nutritionist)

Awareness on obesity

Causes of obesity

All FGD participants believed that obesity could result from unhealthy diet (e.g., oily and fatty food), lack of exercise, and sedentary lifestyles. Few mentioned heredity and old age as causes to overweight. Participants aged 40 and over reported they gained weight without any specific reasons although they try to maintain their diet.

> *"In my case, I eat chapatti in the evening and rice in the morning. Still my belly does not get decreased. In the past, despite my massive eating, I did not gain weight. Now, even drinking water, leads to weight gain."*(Male, above 40)

> *"For some, it looks like genetics. Their grandparents are fat and so are the grandchildren."* (Female, above 40)

Female participants further added the reasons for being obese, such as use of family planning devices, increase in amount of food during childbirth, and habit of eating leftovers to prevent food waste.

> *"(I) was told to eat more during my child birth. Everyone used to say that I need more than before. So, the amount of my food increased. I used to eat less before (giggles)"* (Female, above 40yrs.)

> *"It's like, someone leaves the food, and instead of throwing, I feel like should eat it. Why to throw (food)? So, I gained weight."* (Female, above 40yrs.)

Complicaitons of obesity

Musculoskeletal problems, such as difficulity sitting and walking, back pain, and pressure on heel due to overweight were the predominant complications reported by participants. Many reported high blood pressures, while few mentioned diabetes, high cholesterol, and heart disease as complications. Participants' knowledge of complications were not only based on their experience but also what they had seen in their family and community.

> *"As per my experience, it is better to lose weight than to gain it. […] Once I had an experience of being overweight. It was difficult. It's like I had Asthma [disease]. I could not walk."* (Male, under 40yrs.)

Some participants also expressed their concern regarding appearance resulting from overweight. A male participant under 40 years stated, he was ashamed of walking with his friends when he was overweight. Another participant said,

> *"Our body shape looks bad. […] (We) look older in younger age because of obesity.* (Male, under 40yrs.)

HPs commented that people do not take obesity seriously as they do not have adequate knowledge about its complications. As one said:

> *"Until and unless the disease does not get complicated, it barely comes to their mind that they should go for check-up. Otherwise, they don't even give a try to reduce weight although they are asked to do so."* (Medical Officer)

People who feared the health consequences of obesity usually ask the HPs for suggestions to reduce weight. However, one health provider emphasized that the reason of being concerned is the appearance rather than disease.

> *"I see these days that people are concerned with obesity not because of disease but because of how they look physically. There are very few who concerns about disease."* (Medical Officer)

Attitude towards obesity and overweight

FGD participants reported that overweight was considered good in the society, both health-wise and appearance-wise. Few participants under 40 years also expressed their willingness to increase weight. One female participant described how odd it was to have a relatively thinner member in the family:

> *"…we are five daughters-in-law in the family…it looks odd when there is one thin person in the room…it does not match in the family."* (Female, under 40yrs.)

For women, gaining weight after marriage was viewed as good in the society.

> *"If I lose my weight and visit there [maternal home], they [neighbors] would say that my husband did not provide me enough to eat [giggles]. If I go with my increased weight, they will say that my husband loves me."* (Female, under 40yrs.)

However, too much weight gain (obesity) was perceived as bad in the community. People's perception/attitude towards obesity has been changing in the community, which is attributed to information provided through media (TV, radio) and increasing disease prevalence due to obesity in the community.

> *"…My mother-in-law used to say that if she saw any handsome and healthy person then she thought that the person belongs to high economic class. […] She says it is good. However, nowadays, her view has changed. Now*

> *she says that it is not good to gain weight, and excess weight results in disease.* (Female, under 40yrs.)

Most participants expressed positive attitude towards thinness and expressed their willingness to lose weight. Those who had already faced problems or are currently facing problems due to obesity/overweight, both disease-and appearance-wise, did not want to increase their weight though their family and community commented on them.

> *"If we, the overweight people, lose weight, we get comments (from others) like- what happened, what disease you suffered from, are you stressed, and all. But we have to take care of our own body though people comment."* (Female, above 40yrs.)

HPs also mentioned about the low self-esteem and psychological stress they found among obese people, especially in teenagers, because of the comments that people pass onto them.

> *"It's like okay if someone [obese individuals] can take it easily when they are called fat ["Mote"]. Otherwise, what I also have seen among teenagers of age 16-17 years is that they do not participate in dance [competitions]. They do not participate in game competitions because they think people will stare at them and flatter them. Such cases come often.* (Nutritionist)

HPs commented that though excessive weight (obesity) and thinness are considered bad in the community, overweight is still considered good. This concept is hard to change among people, even in educated people when it comes to children. The provider described saying,

> *"(I have seen) a woman with a lean child. She cried after seeing another chubby baby by her side grieving what had happened to her own children. That was a difficult time for me [to counsel her]."* (Nutritionist)

Body size perception

Before carrying out the discussion, we measured height and weight of each participant. We observed that all participants aged 40 and over were found to be either obese or overweight. Nevertheless, when asked what they feel about the body size, majority of them perceived that their weight was normal.

> *"It would be good if I could decrease my belly size. Otherwise, I feel like I am normal."* (Male, under 40yrs.)

Majority of the participants under 40 years had normal weight when measured. Two participants, one male and one female, considered themselves as overweight though they were found to be in normal weight.

Most participants measured their body weight through clothes' size, looking into mirrors, and from others' comment on their body, while only few male participants reported measuring their weight in a scale, when possible. However, HPs commented that the number of people who are aware of/interested in measuring their weight is increasing in the community. As one said,

> *"If we remember those people who measured their weight, the count will be double than our patients." (Auxiliary Health Worker)*

Barriers to weight management

Challenges in behavior modification

All FGD participants mentioned that diet modification and exercise are keys to prevent and control obesity. However, only few of them exercise to maintain/reduce their weight. The major reported barriers were busy schedule and laziness followed by cold weather and lack of space or physical facilities. Participants above 40 years reported comorbidities like musculoskeletal pain limits their physical activities.

> *"I cannot go [for exercise]. Otherwise, I want to walk. It is difficult for me to walk, my leg aches".* (Female, above 40yrs.)

> *"I don't have friends to walk together with. Here is no place for Yoga. […]. I also need to manage time at home"* (Female, under 40yrs.)

Two female participants under 40 years reported that they feel normal, and thus do not feel a need to exercise.

> *"We will exercise if we need to. Otherwise, it (the life) is going on. So, I feel- why should I exercise?"* (Female, under 40yrs.)

Participants had diverse opinion on the adequate level of physical activity. Few believed that household chores like cooking and washing clothes are adequate for exercise, while others thought exercise is only adequate when they sweat. The required duration of exercise ranges from 10 minutes to 3 hours a day.

The frequently reported barrier for diet control was difficulty in changing food habit due to food taste and desire to eat. Participants also mentioned unavailability of healthy food due to use of excessive pesticides in vegetables and fruits. In addition, people's attraction towards junk food because of its easy availability, accessibility, and time saving nature has limited the use of healthy food. One participant complained that people eat junk food to show themselves belonging of higher social status in the community.

> *"If our children walk taking the juice bottles and drinking juices, then that reflects a higher status. But, if they walk eating homemade popcorn, then that reflects the lower status.* (Male, under 40yrs.)

Lack of HP's knowledge and anthropometric measurement device

HPs usually identify a person with overweight and obesity by measuring their weight and height, by observation, and by patient's own complain. When asked specifically about measuring central obesity, the health providers at the tertiary level stated that they measure waist circumference only for those who are diabetic or have metabolic syndrome. However, the health providers at the peripheral level were not aware of measuring central obesity. One put it this way-

> *"We have not done that (measured central obesity). We do not have instrument. We also do not have such information. If we were given instrument and the District Health Office directed us to do so or if we were given any training…we do everything based on our own knowledge. We do not have anything extra."* (Auxiliary Health Worker)

Lack of counseling

HPs at the peripheral level provide counseling to patients for 7 mins to half an hour

depending upon patient's condition and provider's available time. The Nutritionist spends around half an hour to 45 minutes in counseling. However, the medical officer at the tertiary level could provide a maximum of 5 minutes for counseling because of their time constraint and high patient flow in a day. The officer mentioned that it would be helpful if they had a helping hand.

> *"Yes, I think it's a time factor [for not counseling patients]. And another, I think it is helpful if we get a helping hand. One will take a note when one measures [weight], it expedites the process."* (Medical Officer)

Discussion

In this study, obesity was perceived as a growing problem in the community. A cross-sectional study (2016) among a cohort of 18 years and older in the same study community reported the prevalence of overweight and obesity as 28.4% and 8.1%, respectively.[9] Whereas, the 2019 WHO STEPS survey among 15-45 years Nepalese adults reported the prevalence of overweight and obesity as 20% and 4.3%, respectively.[6]

Obesity was mainly a problem in those who are 40 years and older, married, office workers, businessman, retired individuals, and housewives. A study among civil servants in Nepal reported that married participants were 7.5 times more likely to be overweight/obese than non-married, and the job title was related with being overweight/obese.[15]

Participants mainly linked the causes of obesity to personal factors, such as fatty diet and physical inactivity, which is similar to other studies.[8 15-18] Few of our participants reported heredity as a cause of obesity. This is in contrast to the previous study done among civil servants in Nepal, where almost equal number of participants viewed "fatty foods" or "a genetic disorder" as a cause to obesity.[15] In addition to above personal factors, women in our study stressed on social and medical factors (such as use of contraceptives) as reasons to gaining weight. In Nepalese society, higher consumption of food during childbirth is related

with higher milk production, improved milk quality, and the well-being of both mother and child.

Health and appearance are the key motive to lose weight.[19 20] Our participants who were concerned about the consequences of obesity and their appearance were more willing to lose or maintain their current weight. However, it is important to consider if people are only concerned with their appearance because the weight loss for a transient period to appear fit and attractive, such as in social events, will not be sustainable, and the attempt to lose massive weight in short duration can be hazardous.

In our study, almost all participants who were 40 years and older underestimated their body weight, though they all met the criteria of overweight and obese. The finding is similar to the studies conducted in Tanzania,[11] Cameroon[21] and in the United states.[16] Studies have also reported gender variation in the weight estimation,[8 22] men above 40 years are more likely to underestimate their weight than females of that age groups.[21] Interestingly, two overweight male participants who were 40 years and older in our study viewed themselves as underweight. Individuals who do not perceive themselves as overweight and obese are likely to gain more weight due to their low risk perception and unwillingness to lose weight.[8 11 12]

Big belly is culturally accepted as a sign of prosperity in Nepal.[7 15] Overweight is considered good, healthy, and attractive, which is consistent with other studies.[8 16] Most strikingly, this was frequently reported by women under 40 years of age. Researches have shown that women may be more accepting of obesity than men, thus have less negative attitude towards obese individuals.[23] However, further studies on the role of gender in weight related acceptance is needed.

Although overweight is acceptable, participants have negative attitude towards obese person, which is congruent with other studies.[8 16 24 25] Obese person is viewed as someone who is

lazy, heavy, unattractive, and have illness associated with obesity. Studies have shown consequences of others' negative attitudes among obese persons. [8 15 16 24 25] A study in Cameoon reported that the overweight Caucasian and African American women were viewed differently and were discriminated despite their hard work.[16] Such internalized stigma among obese individuals is particularly from the belief that obesity is a result of individual's failure to maintain healthy lifestyle.[24] Considering the fact that participants in our study also pointed out the internal factors, like diet and exercise, as prominent reasons to obesity, it is important to aware people regarding different socio-cultural and medical causes associated with obesity to reduce obesity related stigma and negative attitude.[24] Further study to explore the impact of negative attitude on overweight or obese individuals would be beneficial to develop interventional programs.

Adequate exercise and healthy diet are keys to manage obesity and other chronic diseases.[26] Even though participants in our study were aware that healthy lifestyle will benefit them, they did not implement it. This difference in knowledge and practice has been described in many studies.[8 27-29]

As in other low and middle-income countries,[18 24 30] obesity is primarily assessed based on BMI in Nepal. However, BMI cannot differentiate between weight because of excessive muscle percentage and proportions of body fat.[24] Studies have shown that people with normal BMI are at risk of cardiovascular diseases because of Central obesity. [18 24 30] The prevalence of central obesity has been increasing in South Asians. A study in Nepal (2006) reported higher prevalence of central obesity than general obesity among study population in Dharan.[31] Similarly, a study in China reported that the prevalence of central obesity among adults with BMI <25kg/m^2 increased by almost two-fold from 11.9% in 1993 to 21.1% in 2009. If the study did not consider measuring WC for obesity, they would have missed 65%

of the cases.[30] This highlights the importance of measuring WC to accurately predict obesity in the clinical settings.

This study is one among few qualitative studies of its kind in Nepal that aimed to understand the perception of obesity among adult in a sub-urban community from both community and health provider's perspective. The use of open-ended questions provided insights into participants' views and experiences. However, several limitations exist. This study is confined confined to sub-urban area; therefore, the perception of urban and rural areas is underrepresented. However, qualitative study is intended to understand phenomenon, and not to analyze the relationship between variables.[28 29] Although few number of health providers were interviewed in this study, we have considered to include them from the different health care levels. Given these limitations, however, the study provides profound information on community's perception regarding obesity in Nepal.

Conclusions

This qualitative study explored the knowledge, attitude, and perception of obesity among Nepalese adults in a sub-urban community. Given the participants' misconception and inadequate knowledge regarding obesity, and the underestimation of their body size, it is suggested to design and disseminate culturally appropriate health information to manage obesity in the community. Our finding shows that the providers at the peripheral health institutions lack training and instrument to measure central obesity. Since the prevalence of central obesity is rising in South Asians, including Nepalese population, it is important to consider central obesity while training health workers at the peripheral level.

List of abbreviations

BMI: Body Mass Index

FGD: Focus Group Discussion

HP: Health Provider

IDI: In-depth Interview

STEPS: STEPwise approach to surveillance

WHO: World Health Organization

Declarations

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Author contributions

SS, the principal investigator, conceived the study, transcribed and analysed data, and developed the manuscript. BMK contributed to research design. SA contributed to collecting and analysing the data. SS contributed to revising manuscript. All authors read and approved the final manuscript for publication.

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Competing interests

None declared

Patient consent for publication

Not required.

Ethics approval

Ethical approval was obtained from the Kathmandu University School of Medical Sciences Institutional Review Committee (IRB# 36/16). Informed consent was received from all participants before participation in the study.

Provenance and peer review

Not commissioned, externally peer reviewed.

Data availability statement

No data are available.

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Standards for Reporting Qualitative Research (SRQR)[a]

No. Topic	Item	Page/ line no(s).
Title and abstract		
S1 Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
S2 Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions	2
Introduction		
S3 Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
S4 Purpose or research question	Purpose of the study and specific objectives or questions	4
Methods		
S5 Qualitative approach and research paradigm[b]	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended	5
S6 Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability	6
S7 Context[b]	Setting/site and salient contextual factors; rationale[a]	5
S8 Sampling strategy[b]	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale[a]	5
S9 Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	20
S10 Data collection methods[b]	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale[a]	5-6
S11 Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5-6

S12 Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-6, 7-8
S13 Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts	6
S14 Data analysis[b]	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale[a]	6,8-9
S15 Techniques to enhance trustworthiness[b]	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale[a]	6
Results/Findings		
S16 Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	7-15
S17 Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-15
Discussion		
S18 Integration with prior work, implications, transferability, and contribution(s) to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	15-18
S19 Limitations	Trustworthiness and limitations of findings	18
Other		
S20 Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	20
S21 Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	19

[a]The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

[b]The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference: O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Academic Medicine, Vol. 89, No. 9 / Sept 2014 DOI: 10.1097/ACM.0000000000000388

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Perception of obesity and overweight among adults living in suburban Nepal: A qualitative study

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Abstract

Objective

To explore the perception of obesity and overweight among Nepalese adults living in a suburban community.

Design

A qualitative study comprising focus group discussion and in-depth interview.

Setting

Community and health care facilities in Dhulikhel, Nepal.

Participants

Four focus group discussions were conducted with community members (n= 22) and four in-depth interviews were conducted with healthcare providers.

Results

Obesity was a rising problem in this suburban community. Participants had inadequate knowledge regarding the consequences of obesity, and they perceived overweight as normal, healthy, and attractive. The participants above 40 years of age did not perceive themselves to be overweight or obese. Despite participants' awareness of the importance of diet control and exercise to prevent obesity, these were not translated into practice.

Conclusions

This study provided insight into perceptions of obesity in a suburban Dhulikhel community through both community members' and healthcare providers' perspective. Misconceptions and inadequate knowledge of obesity among people in this community indicate the need for health education and interventional programme to increase health awareness and preventive practices.

Keywords: obesity, overweight, perception, qualitative study, Nepal, public health, cardiovascular disease

Strengths and limitations of this study

- To our knowledge, this is the first qualitative study in Nepal to explore the perception of obesity among adults in a suburban community in Nepal.
- The study includes in-depth views of both community members and health care providers working at different levels.
- The study is limited to the Dhulikhel Heart Study participants residing in a suburban area; therefore, the findings of the study may not be transferable to rural or urban areas.

Background

Obesity is one of the top five causes of cardiovascular mortality and morbidity globally[1] causing an increased risk of coronary artery disease, diabetes mellitus, hypertension, and kidney failure.[2] The rate of obesity has increased in many developing nations, including in Nepal.[3-5] About 24.3% of Nepalese adults are obese or overweight.[6]

Several demographic, socio-economic, and cultural factors contributing to obesity have been described elsewhere.[7-9] Like other developing countries, Nepal is undergoing epidemiologic and demographic transition, experiencing significant lifestyle changes. [7-10] Urbanization, leading to an increased number of fast-food restaurants, the growing culture of 'eating out', and the availability of lower-priced, higher caloric food have contributed to obesity. The 2019 WHO STEP survey reported low physical activity and low vegetable and fruit consumption in Nepal.[6]

Studies have found a relationship between obesity and body weight/size perception. Unlike in developed countries, a heavier body is preferred in many developing countries, such as South Africa and Tanzania.[8 11] In Nepal, traditionally, having a 'big belly' is considered a sign of prosperity.[7] This perceived norm might be facilitating weight gain, particularly among high-income individuals and families. However, with epidemiologic transitions and technological advancements occurring globally, this perception may be changing. It is also important to understand how the individual perceives their body size. The individuals who do not see themselves as overweight/ obese are prone to gain weight because of their low-risk perception and unwillingness to lose weight.[8 11 12] On the other hand, females generally misperceive body weight, deeming it higher than it is, and thus are dissatisfied with their bodies compared to males.[13]

In 2015, the Dhulikhel Heart Study, a population-based cohort study on cardiovascular disease and its risk factors, was conducted among adults living in Dhulikhel, a suburban town

in Nepal.[14] The study found a high prevalence of cardiovascular disease and its risk factors, such as obesity. Given the high prevalence of obesity and poor cardiovascular health literacy, the development of effective health education and interventional programmes to manage obesity in this community is vital. Though studies regarding obesity perception have been conducted in many low- and middle-income countries (LMICs)[8 15-17], information on body size self-perception and willingness to lose weight among Nepalese adults is limited. In 2009, Simkhada et.al[18] conducted a cross-sectional study to assess knowledge, attitude, and prevalence of overweight and obesity among civil servants in Nepal. Few qualitative studies that have been conducted in this context focus primarily on diet and exercise.[19 20] To our understanding, there are no qualitative studies conducted to date exploring body size perception and willingness to lose weight among adults in Nepal. Also, no studies exist to understand obesity from the healthcare provider's perspective in Nepal. Our study aims to fulfill the above-mentioned gaps in knowledge by exploring the perception of obesity and overweight among Nepalese adults, including both community members and healthcare providers (HCP).

METHODS

Study design and setting

This was a qualitative study under a large cohort study, the Dhulikhel Heart Study (DHS), which is a longitudinal cohort study conducted between November 2013 and February 2015 to assess the prevalence of cardiovascular diseases and its risk factors among adults of 18 years and older living in Dhulikhel, a sub-urban town in Nepal.[14]

Participants

We conducted four focus group discussions (FGD) with 22 DHS participants. We used FGDs for community members as this method is proven to adequately gather information on the

perception of obesity among adults in LMICs.[8 15] Participants were selected using purposeful sampling methods. A list of DHS participants was obtained and stratified into four groups by gender (male and female) and age (<40years and ≥40years). The separation of gender was necessary because women in Nepalese culture are usually shy and do not discuss explicitly in presence of men. The researcher contacted 12 eligible participants from each group via phone call to request participation in the study. Participants who provided verbal consent were invited for discussions. Of the total 48 eligible participants who agreed to participate, 22 took part in the group discussions. Six participants who initially agreed to participate did not attend the discussion. The reasons for non-participation were busy schedules on the given time and date and medical illness.

For the in-depth interview (IDI), we purposefully selected four health providers (HPs) from different healthcare levels to explore barriers to obesity management. We selected one doctor and a nutritionist from the tertiary hospital, an in-charge from a primary health care center, and an in-charge from an urban health care center. All HCPs who were invited agreed to participate in the study and were interviewed.

Data collection

We collected data from October 2016 to December 2016. We developed initial guidelines in Nepali. The FGD guideline was pilot tested among 6 DHS participants, and the IDI guideline was pre-tested with a doctor in the tertiary hospital. The guidelines were then reviewed and modified accordingly. The findings from the pre-tested FGD and IDI were not included in this analysis.

All FGDs were moderated by the researcher and assisted by a note-taker. The moderator was not from the study community and, hence had no prior knowledge about the participants before the study. The moderator started each session by briefly explaining the aim of the

study and receiving informed consent. Participants' height and weight were also measured before the discussion commenced. The moderator started the discussion with open-ended questions and probed further for in-depth information. The FGD guideline included 10-item questions under four topics– body size perception; knowledge on obesity; attitude towards obesity; and barriers to weight management. For the perception of body size, we asked participants' views on their body size, and then probed why they think their body is normal or overweight or obese and how they measure their body size. To explore participants' knowledge of obesity, we asked questions on the perceived cause and complications of obesity and further probed if certain groups in the community are perceived as more obese than others. On attitude towards obesity, we asked the following questions, 'How do you view overweight and obesity?', and 'What influences society's views on obesity?' Regarding the willingness to lose weight or maintain optimally, we asked about the perceived barriers to weight management. We conducted FGDs in a private space at a community building. The group size varied from 3 to 7. FGD participants were offered a light snack for their time and participation.

The investigator (SA) conducted IDIs with HCPs in the private room at their respective health care centers. Informed consent was received before each interview. The IDIs were conducted to understand the burden of obesity in the community, providers' perspectives on the community's knowledge and attitude on obesity, and providers' related barriers to obesity management. The questions included 'What percentage of patients attending to your institution are overweight or obese?', 'In general, how well do you think patients understand overweight and obesity?', 'How do community members view/perceive obesity?', 'Are there any common misconceptions in the community about obesity?', and 'What factors affect obesity management?' The moderator further probed on the above questions to explore further information.

Data analysis

FGDs and IDIs were recorded and transcribed verbatim in Nepali. SS transcribed all recorded data. Data were analysed using the hybrid thematic analysis approach.[21] We started with an "a priori" list of codes drawn from the literature review and research questions and included additional codes that emerged during the inductive analysis process.[22] One FGD and two interview transcripts were coded separately by two independent coders (SS and SA) to enhance the data validity. Coders discussed similarities and differences in the way codes were applied and agreed on the emerging codes. The interconnected codes were then grouped into sub-groups and sub-groups were further grouped into broad themes. After the discussion, the final codebook was updated. SS further analysed the transcripts and grouped text units as per the codes using the Atlas ti.7. Selected quotes were reported.

Ethics statement

All participants who gave verbal consent to participate in the study also signed an informed consent form. Participation in the study was voluntary. All collected data were kept safe and strictly confidential.

Patient and public involvement

The study design and objectives were informed by previous findings from the DHS study, which indicated the high prevalence of obesity and poor cardiovascular health literacy among the community members. Although we did not specifically do separate community engagement for this study, we did include the discussions in the planning of the DHS in several community activities at schools, wards, meetings with female community health volunteers, and other local community clubs.

RESULTS

Characteristics of participants

The characteristics of the FGD participants are presented in table 1.

Table 1: Socio-demographic characteristics of FGD participants

Characteristics	Participants (n=22) n (%)
Age group	
20-39	10 (45.5)
40-59	10 (45.5)
>60	2 (9.0)
Gender	
Male	10 (45.5)
Female	12 (54.5)
Ethnicity	
Newar	25 (71.4)
Brahmin	5 (14.3)
Tamang	4 (11.4)
Marital status	
Married	15 (68.2)
Not married	6 (27.3)
Widow	1 (4.5)
Education	
No formal education	3 (13.6)
Primary level education	2 (9.1)
Secondary level	6 (27.3)
High school or more	9 (40.9)
Occupation	
Employed	3 (13.6)
Self-employed*	9 (40.9)
Homemakers	4 (18.2)
Unemployed	2 (9.1)
Student	4 (18.2)
BMI	
<25kg/m^2	9 (40.9%)
≥25-29kg/m^2	6 (27.3%)
≥30kg/m^2	7 (31.8%)

*Self-employed includes business and agriculture

We categorized themes derived from FGDs and IDIs into five categories: (1) Burden of obesity; (2) Knowledge of obesity; (3) Attitude towards obesity; (4) Body size perception; and, (5) Barriers to obesity management. The example of coding, categorizing, and formulating themes is given in table 2.

Table 2: Example of coding, categorizing, and formulating themes

Codes	Definition of codes	Sub-category	Category	Theme
Busy Schedule	Any reference to discontinuing or not initiating exercise due to the patient's lack of time.	Exercise habit	Challenges in behavior modification	Barriers to weight management
Laziness	Any reference to discontinuing or not initiating exercise due to the patient's laziness.			
Co-morbidities	Any reference to discontinuing or not initiating exercise due to the patient's existing disease/condition.			
Weather	Any reference to discontinuing or not initiating exercise due to weather conditions.			
Lack of physical facilities	Any reference to discontinuing or not initiating exercise due to lack of physical facilities and/or adequate space to exercise.			
Food taste	Any reference to the difficulty in modifying dietary habits due to food taste.	Food habit		
Desire to eat	Any reference to the difficulty in modifying dietary habits due to the patient's desire to eat what they see.			
Junk food	Any reference to the difficulty in modifying dietary habits due to easy availability and accessibility of junk food.			
Lack of access to healthy food	Any reference to the difficulty in modifying dietary habits due to the inaccessibility of healthy food.			

Burden of obesity

Both FGD participants and HCPs identified obesity as a growing problem in the community. A medical officer stated that among the 20-25 patients he examines in a day, 7-8 of them are either overweight or obese. He further commented that while obesity might be increasing among teenagers, these teenagers are not under their radar as they seldom visit doctors. Obesity was found to be higher among females and individuals aged 40 years and over in the community. Participants also pointed out that obesity is high among particular ethnic groups, such as Newar and Tamang, and among other sub-groups such as married persons, office workers, housewives, businessmen, drivers, rich people, and people living in urban areas.

> *"In Newari culture, there are a lot of feasts and festivals, so they eat a lot. In the case of Tamang, they drink (alcohol) a lot. They eat much while drinking. Both are high in calories, so this might result in weight gain."* (Nutritionist)

Awareness of obesity

Causes of obesity

All FGD participants believed that obesity could result from an unhealthy diet (e.g., oily and fatty food), lack of exercise, and sedentary lifestyles. Few mentioned heredity or old age as causes of overweight. Participants aged 40 and over reported they gained weight without any specific reasons while maintaining their diet.

> *"In my case, I eat chapatti in the evening and rice in the morning. Still, my belly does not get decreased. In the past, despite my massive eating, I did not gain weight. Now, even drinking water leads to weight gain."*(Male, above 40)

> *"For some, it looks like genetics. Their grandparents are fat and so are the grandchildren."* (Female, above 40)

Female participants further added the reasons for being obese, such as the use of family planning devices, an increase in food intake after childbirth, and the habit of eating leftovers to prevent food waste.

> *"(I) was told to eat more during my childbirth. Everyone used to say that I need more than before. So, the amount of my food increased. I used to eat less before (giggles)"* (Female, above 40yrs.)

> *"It's like, someone leaves the food, and instead of throwing, I feel like [I] should eat it. Why throw (food)? So, I gained weight."* (Female, above 40yrs.)

Complications of obesity

Musculoskeletal problems, such as difficulty sitting and walking, back pain, and pressure on the heel due to overweight were the predominant complications reported by participants. Many also reported high blood pressures, while few mentioned diabetes, high cholesterol, and heart disease as complications. Participants' knowledge of complications was not only based on their experience but also on what they had seen in their family and community. Participants who had overweight were more concerned about complications, in terms of both their health and appearance, than those with a normal weight. Male participants under the age of 40 years were more concerned about their health and appearance due to overweight. One overweight male participant under 40 years stated he was ashamed of walking with his friends, and added:

> *"As per my experience, it is better to lose weight than to gain it. […] Once I had an experience of being overweight. It was difficult. It's like I had Asthma [disease]. I could not walk." (Male, under 40yrs.)*

> *"Our body shape looks bad. […] (We) look older ata younger age because of obesity.* (Male, under 40yrs.)

HCPs, however, commented that people do not take obesity seriously because they lack adequate knowledge about its complications. Once HCP said:

> *"Until and unless the disease does not get complicated, it barely comes to their mind that they should go for a check-up. Otherwise, they don't even give a try to reduce weight although they are asked to do so."* (Medical Officer)

Participants who feared the health consequences of obesity usually ask the HPs for suggestions to reduce weight. However, one HCP emphasized that the reason for being concerned is the appearance rather than disease.

> *"I see these days that people are concerned with obesity not because of disease but because of how they look physically. There are very few who [are] concerned about disease."* (Medical Officer)

Attitude towards obesity and overweight

FGD participants reported that overweight was considered good in society, both health-wise and appearance-wise. Some participants under 40 years also expressed their willingness to increase weight. One female participant described how odd it was to have a thin figure in her family:

> *"...we are five daughters-in-law in the family...it looks odd when there is one thin person in the room...it does not match in the family."* (Female, under 40yrs.)

For women, gaining weight after marriage was viewed positively.

> *"If I lose my weight and visit there [maternal home], they [neighbors] would say that my husband did not provide me enough to eat [giggles]. If I go with my increased weight, they will say that my husband loves me."* (Female, under 40yrs.)

However, participants also believed that too much weight gain (obesity) was perceived as bad in the community and that community perception/attitude towards obesity has been changing. Particpants attributed this change to the information provided through media, such as television and radio, and to increasing obesity-related disease prevalence in the community.

> *"...My mother-in-law used to say that if she saw any handsome and healthy person then she thought that the person belongs to high economic class. [...] She says it is good. However, nowadays, her view has changed. Now she says that it is not good to gain weight, and excess weight results in disease.* (Female, under 40yrs.)

Most participants expressed a positive attitude towards thinness and expressed their willingness to lose weight. Those who had already faced problems or are currently facing

problems due to obesity/overweight, both disease-and appearance-wise, did not want to increase their weight despite comments from their family and.

> *"If we, the overweight people, lose weight, we get comments (from others) like- what happened, what disease you suffered from, are you stressed, and all. But we have to take care of our own body although people comment."* (Female, above 40yrs.)

HCPs also mentioned the low self-esteem and psychological stress they found among obese people, especially in teenagers, because of negative comments that people make about them.

> *"It's like okay if someone [obese individuals] can take it easy when they are called fat ["Mote"]. Otherwise, what I also have seen among teenagers age 16-17 years is that they do not participate in dance [competitions]. They do not participate in game competitions because they think people will stare at them and flatter them. Such cases come often.* (Nutritionist)

HCPs commented that though excessive weight (obesity) and thinness are considered bad in the community, overweight is still considered good. This concept is hard to change among people, even in educated people when it comes to children. The provider described saying,

> *"(I have seen) a woman with a lean child. She cried after seeing another chubby baby by her side grieving what had happened to her children. That was a difficult time for me [to counsel her]."* (Nutritionist)

Body size perception

Before carrying out the discussion, we measured the height and weight of each FGD participant. All participants aged 40 and above were found to be either obese or overweight. Nevertheless, when asked what they feel about body size, the majority of them perceived that their weight was normal.

> *"It would be good if I could decrease my belly size. Otherwise, I feel like I am normal."* (Male, under 40yrs.)

The majority of participants under 40 years had normal weight. Two participants, one male and one female, considered themselves overweight although their measurement indicated normal weight.

Most participants perceived their body size and weight by measuring their clothes' size, evaluating themselves in mirrors, and experiencing others' comments about their body, while only a few male participants reported measuring their weight on a scale, when possible. However, HCPs reported that the number of people who are aware of and/or interested in measuring their weight is increasing in the community. As one said,

> *"If we remember those people who measured their weight, the count will be double than our patients." (Auxiliary Health Worker)*

Barriers to weight management

Challenges in behavior modification

All FGD participants mentioned that diet modification and exercise are keys to prevent and control obesity. However, only a few of the participants reported exercising to maintain or reduce their weight. Both overweight or obese and normal-weight participants reported similar barriers to weight management. The most commonly reported barriers were busy schedule and laziness followed by cold weather and lack of space or physical facilities for exercise. Participants above 40 years of age reported that comorbidities such as musculoskeletal pain limits their level of physical activity.

> *"I cannot go [for exercise]. Otherwise, I want to walk. It is difficult for me to walk, my leg aches".* (Female, above 40yrs.)

> *"I don't have friends to walk together with. Here is no place for Yoga. […]. I also need to manage time at home"* (Female, under 40yrs.)

Two female participants under 40 years of age reported that they feel normal, and thus do not feel a need to exercise.

> *"We will exercise if we need to. Otherwise, it (the life) is going on. So, I feel- why should I exercise?"* (Female, under 40yrs.)

Participants had a diverse opinion on the adequate level of physical activity. A Few believed that household chores like cooking and washing clothes were adequate for exercise, while

others thought that exercise was only adequate when they sweat. Participants'required duration of exercise ranged from 10 minutes to 3 hours a day.

The most frequently reported barrier for diet control was difficulty in changing food habits due to food taste and desire to eat. Participants also mentioned the unavailability of healthy food due to the use of excessive pesticides in vegetables and fruits. In addition, participants' reported that the increased availability and efficiency of consuming junk food has limited their consumption of healthier food. Consuming junk food was also a status symbol. One participant explained that people in the community eat junk food to show that they belong to a higher social status.

> *"If our children walk taking the juice bottles and drinking juices, then that reflects a higher status. But, if they walk eating homemade popcorn, then that reflects the lower status.* (Male, under 40yrs.)

Lack of HCP's knowledge and anthropometric measurement tools

HCPs reported that overweight and obesity were identified by measuring a patient's weight and height, by observation, and by the patient's complaint. When asked specifically about measuring central obesity, the HCPs at the tertiary level stated that they measure waist circumference only for those who are diabetic or have a metabolic syndrome. However, the HCPs at the peripheral level were not aware of measuring central obesity. One put it this way-

> *"We have not done that (measured central obesity). We do not have an instrument. We also do not have such information. If we were given an instrument and the District Health Office directed us to do so or if we were given any training…we do everything based on our knowledge. We do not have anything extra."* (Auxiliary Health Worker)

Lack of counseling

HCPs at the peripheral level counsel to patients for 7 mins to half an hour depending upon the patient's condition and the provider's available time. At the tertiary leve, the Nutritionist spends around half an hour to 45 minutes in counseling. However, the

medical officer at the tertiary level could only provide a maximum of 5 minutes for counseling because of their time constraints and high daily patient volume. The medical officer mentioned that it would be helpful if they had additional assistance.

> *"Yes, I think it's a time factor (for not counseling patients). And another, I think it is helpful if we get a helping hand. One will take a note when one measure (weight), it expedites the process."* (Medical Officer)

Discussion

This study explored the perception of obesity and overweight among Nepalese adults living in a suburban community. We found that participants had inadequate knowledge and misconceptions regarding obesity and had perceived overweight as normal, healthy, and attractive. The adults above 40 years of age did not perceive themselves to be overweight or obese even when they were. Only a few participants reported exercising and controlling their diet to prevent obesity or manage their weight.

Obesity was perceived as a growing problem in the Dhulikhel community. A 2016 cross-sectional study by Shrestha et. al reported the prevalence of overweight and obesity among DHS participants of 18 years and older were as 28.4% and 8.1%, respectively.[9] Similarly, the nationally conducted WHO STEPS survey in 2019 reported the prevalence of overweight and obesity among Nepalese adults aged 15-45 years as 20% and 4.3%, respectively.[6] In our study, participants reported that obesity was mainly a problem among individuals who are 40 years of age and above, married persons, office workers, businessmen, retired individuals, and housewives. A 2011 study among civil servants in Nepal reported that married participants were 7.5 times more likely to be overweight/obese than non-married. Additionally, the occupation was found to be related to being overweight/obese.[18] Based on the above findings, it is important to design interventional programmes targeting these populations to prevent overweight and obesity.

Participants mainly linked the causes of obesity to personal factors, such as fatty diet and physical inactivity, which is similar to other studies conducted in Nepal, India, Malaysia, South Africa, and Morocco.[8 17 18 23 24] Few of our participants reported heredity as a cause of obesity. This contrasts with the result from the previous study done among civil servants in Nepal, which found that an almost equal number of participants viewed "fatty foods" or "a genetic disorder" as a cause of obesity.[18] In addition to personal factors, women in our study stressed social and medical factors such as marriage, childbirth, the habit of eating left-overs, and the use of contraceptives as causes of obesity and overweight among females. In Nepalese society, gaining weight right after marriage is considered a good sign of a healthy relationship with a husband and in-laws. Culturally, Nepalese prefers to finish the food on the day that is cooked. As women are the last members of a household to eat, they are expected to consume all remaining food. Additionally, women's increased food consumption after childbirth is believed to increase milk production and improved milk quality, and the well-being of both mother and child. Findings from the study conducted in the Laayoun community of Morocco also reported socio-cultural pressure as a factor for increasing weight among females. In contrast to our study, this study reported that single females also desired to gain weight to maintain an ideal cultural beauty. It is important to educate females of reproductive age about obesity risks to promote a healthier lifestyle.

Health and appearance are the key motives to lose weight.[25 26] Similar to findings from previous studies in South Africa and Morocco,[8 27] participants in our study who were concerned about the consequences of obesity and their appearance were more willing to lose or maintain their current weight. However, it is important to consider if people are only concerned with their appearance because the weight loss for a transient period to appear fit and attractive, such as in social events, will not be sustainable, and the attempt to lose a lot of weight in a short duration of time can be hazardous.

In our study, almost all participants who were 40 years and older underestimated their body weight, though they all met the criteria of overweight and obese. This finding is similar to studies conducted in Tanzania,[11] Cameroon[27], and in the United States.[23] Additionally, studies have also reported variation in weight estimation by gender and age.[8 28] A qualitative study in South Africa reported that the majority of overweight and obese female participants perceived themselves to be normal or moderately overweight, and chose the silhouettes that were smaller than their body size.[8]A cross-sectional study in Morocco reported that more females than males underestimated their body weight and males 40 years of age and above were more likely to underestimate their weight compared to females in the same age group.[27] Individuals who do not perceive themselves as overweight and obese are likely to gain more weight due to their low-risk perception and unwillingness to lose weight.[8 11 12] The inability for our participants to accurately recognize their body-weight status may prevent them from adopting healthy behaviors and increase their risk to obesity and its complications. Therefore, the community should be made aware of the importance of measuring their weight at intervals, and health facilities should also increase educational campaigns to improve community awareness.

In Nepal, a big belly is culturally accepted as a sign of prosperity.[7 18] Participants' perception that overweight is considered good, healthy, and attractive is consistent with other studies conducted in South Africa, Morocco, and the United States.[8 23 27] Most strikingly, this was frequently reported by females under 40 years of age. Research has shown that females may be more accepting of obesity than men, and thus have a less negative attitude towards obese individuals.[29] However, further studies on the role of gender in weight-related acceptance are needed.

Although overweight is acceptable, participants have a negative attitude towards an obese person. This reflects the finding of several other studies,[8 15 23 30] whereby obese individuals

are viewed as lazy, heavy, unattractive, and are perceived to have illnesses associated with obesity. Studies have also shown the consequences of others' negative attitudes among obese persons. [8 15 18 23 30] For example, a study in Cameroon reported that overweight Caucasian and African American women were viewed differently and were discriminated against despite their hard work.[23] Such internalized stigma among obese individuals is particularly from the belief that obesity is a result of an individual's failure to maintain a healthy lifestyle.[15] Considering the fact that participants in our study primarily pointed out the internal factors such as diet and exercise, as causes of obesity, it is important to make people aware of socio-cultural and medical factors to reduce obesity-related stigma and negative attitude.[15] Further studies to explore the impact of negative attitudes on overweight or obese individuals in Nepal would be beneficial to develop interventional programmes in this setting.

Adequate exercise and a healthy diet are keys to managing obesity and other chronic diseases.[31] Although participants in our study were aware that a healthy lifestyle will benefit them, they did not implement it. This difference in knowledge and practice has been described in many studies.[8 32-34] This could be due to low awareness of obesity complications. In our study, both the overweight and normal-weight participants reported similar barriers to weight management. This could be because only a few participants in our study reported exercising or controlling a diet to reduce or prevent obesity. Moreover, participants who were overweight did not perceive themselves as overweight and did not feel the need to change their behavior. The cultural acceptance of overweight in Nepalese culture and the difficulties in modifying behavior could be a challenge to implementing the effective intervention programme in this setting.

As in other low and middle-income countries,[15 35 36] obesity is primarily assessed based on BMI in Nepal. However, BMI cannot differentiate between weight because of excessive muscle percentage and body fat proportions.[15] Studies have shown that people with normal

BMI are at risk of cardiovascular diseases because of central obesity. [15 35 36] The prevalence of central obesity has been increasing among South Asians. A 2006 study in Nepal reported a higher prevalence of central obesity than general obesity among the study population in Dharan.[37] Similarly, a study in China reported that the prevalence of central obesity among adults with BMI <25kg/m^2 increased by almost two-fold from 11.9% in 1993 to 21.1% in 2009. If the study did not consider measuring WC for obesity, they would have missed 65% of the cases.[36] This highlights the importance of measuring WC to accurately meausre obesity in clinical settings.

This study is the first qualitative study in Nepal that aimed to understand the perception of obesity among adults in a sub-urban community from both community and healthcare providers' perspectives. The use of open-ended questions provided insights into participants' perspectives and lived experiences. However, several limitations exist. This study is confined to the sub-urban area; therefore, the perception of urban and rural areas is underrepresented. However, a qualitative study is intended to understand a phenomenon, and not to analyse the relationship between variables.[33 34] All the FGD participants belonged to the Hindu religion; therefore, the study could not explore the perception of individuals of other religions. However, the majority of the population in this area are Hindu. Although few numbers of health providers were interviewed in this study, we have considered to include them from the different health care levels. Given these limitations, however, the study provides profound information on the community's perception of obesity in Nepal.

Conclusions

This qualitative study explored the knowledge, attitude, and perception of obesity among Nepalese adults in a suburban community. Given the participants' misconception and inadequate knowledge regarding obesity, and the underestimation of their body size, it is

suggested to design and disseminate culturally appropriate health information to manage obesity in the community. Our finding shows that the healthcare providers at the peripheral health institutions lack training and instrument to measure central obesity. Since the prevalence of central obesity is rising in South Asians, including the Nepalese population, it is important to consider central obesity while training health workers at the peripheral level.

List of abbreviations

BMI: Body Mass Index

FGD: Focus Group Discussion

HCP: Healthcare Provider

IDI: In-depth Interview

STEPS: STEPwise approach to surveillance

WHO: World Health Organization

Declarations

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Author contributions

SS, the principal investigator, conceived the study, transcribed and analysed data, and developed the manuscript. BMK and RK contributed to the research design. SA contributed

to collecting and analysing the data. SSu contributed to revising the manuscript. All authors read and approved the final manuscript for publication.

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Not required.

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Standards for Reporting Qualitative Research (SRQR)[a]

No. Topic	Item	Page/ line no(s).
Title and abstract		
S1 Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
S2 Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions	2
Introduction		
S3 Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
S4 Purpose or research question	Purpose of the study and specific objectives or questions	4
Methods		
S5 Qualitative approach and research paradigm[b]	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended	5
S6 Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability	6
S7 Context[b]	Setting/site and salient contextual factors; rationale[a]	5
S8 Sampling strategy[b]	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale[a]	5
S9 Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	20
S10 Data collection methods[b]	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale[a]	5-6
S11 Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5-6

S12 Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-6, 7-8
S13 Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts	6
S14 Data analysis[b]	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale[a]	6,8-9
S15 Techniques to enhance trustworthiness[b]	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale[a]	6
Results/Findings		
S16 Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	7-15
S17 Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-15
Discussion		
S18 Integration with prior work, implications, transferability, and contribution(s) to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	15-18
S19 Limitations	Trustworthiness and limitations of findings	18
Other		
S20 Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	20
S21 Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	19

[a]The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

[b]The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference: O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Academic Medicine, Vol. 89, No. 9 / Sept 2014 DOI: 10.1097/ACM.0000000000000388

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Perception of obesity and overweight among adults living in suburban Nepal: A qualitative study

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References: 47

Abstract

Objective

To explore the perception of obesity and overweight among Nepalese adults living in a suburban community.

Design

A qualitative study comprising of focus group discussion and in-depth interview.

Setting

Community and health care facilities in Dhulikhel, Nepal.

Participants

Four focus group discussions were conducted with community members (n= 22) and four in-depth interviews were conducted with healthcare providers.

Results

Obesity is a rising problem in this suburban community. Participants had inadequate knowledge regarding the consequences of obesity, and they perceived overweight as normal, healthy, and attractive. The participants above 40 years of age did not perceive themselves to be overweight or obese. Despite participants' awareness of the importance of diet control and exercise to prevent obesity, these were not translated into practice.

Conclusions

This study provided insight into perceptions of obesity in a suburban Dhulikhel community through both community members' and healthcare providers' perspective. Misconceptions and inadequate knowledge of obesity among people in this community indicate the need for health education and interventional programme to increase health awareness and preventive practices.

Keywords: obesity, overweight, perception, qualitative study, Nepal, public health, cardiovascular disease

Strengths and limitations of this study

- To our knowledge, this is the first qualitative study in Nepal to explore the perception of obesity among adults in a suburban community in Nepal.
- The study includes in-depth views of both community members and health care providers working at different levels.
- The study is limited to the Dhulikhel Heart Study participants residing in a suburban area; therefore, the findings of the study may not be transferable to rural or urban areas.
- This study provides information on obesity and its perceived threat in a resource-poor setting. The study has generated recommendations and possible strategies for obesity and NCD prevention in the vulnerable population in Nepal.

Background

Obesity is one of the top five causes of cardiovascular mortality and morbidity globally[1] causing an increased risk of coronary artery disease, diabetes mellitus, hypertension, and kidney failure.[2] The rate of obesity has increased in many developing nations, including in Nepal.[3–5] About 24.3% of Nepalese adults are obese or overweight.[6]

Several demographic, socio-economic, and cultural factors contributing to obesity have been described elsewhere.[7–9] Like other developing countries, Nepal is undergoing epidemiologic and demographic transition, experiencing significant lifestyle changes.[7–10] Urbanization, leading to an increased number of fast-food restaurants, the growing culture of 'eating out', and the availability of lower-priced, higher caloric food have contributed to obesity. The 2019 WHO STEP survey reported low physical activity and low vegetable and fruit consumption in Nepal.[6]

Studies have found a relationship between obesity and body weight/size perception. Unlike in developed countries, a heavier body is preferred in many developing countries, such as South Africa and Tanzania.[8,11] In Nepal, traditionally, having a 'big belly' is considered a sign of prosperity.[7] This perceived norm might be facilitating weight gain, particularly among high-income individuals and families. However, with epidemiologic transitions and technological advancements occurring globally, this perception may be changing. It is also important to understand how the individual perceives their body size. The individuals who do not see themselves as overweight/ obese are prone to gain weight because of their low-risk perception and unwillingness to lose weight.[8,11,12] On the other hand, females generally misperceive body weight, deeming it higher than it is, and thus are dissatisfied with their bodies compared to males.[13]

In 2015, the Dhulikhel Heart Study, a population-based cohort study on cardiovascular disease and its risk factors, was conducted among adults living in Dhulikhel, a suburban town

in Nepal.[14] The study found a high prevalence of cardiovascular disease and its risk factors, such as obesity. Given the high prevalence of obesity and poor cardiovascular health literacy, the development of effective health education and interventional programmes to manage obesity in this community is vital. Though studies regarding obesity perception have been conducted in many low- and middle-income countries (LMICs),[8,15–17] information on body size self-perception and willingness to lose weight among Nepalese adults is limited. In 2009, Simkhada et.al conducted a cross-sectional study to assess knowledge, attitude, and prevalence of overweight and obesity among civil servants in Nepal.[18] Few qualitative studies that have been conducted in this context focus primarily on diet and exercise.[19,20] To our understanding, there are no qualitative studies conducted to date exploring body size perception and willingness to lose weight among adults in Nepal. Also, no studies exist to understand obesity from the healthcare provider's perspective in Nepal. Our study aims to fulfill the above-mentioned gaps in knowledge by exploring the perception of obesity and overweight among Nepalese adults, including both community members and healthcare providers (HCP).

METHODS

Study design and setting

This was a qualitative study under a large cohort study, the Dhulikhel Heart Study (DHS), which is a longitudinal cohort study conducted between November 2013 and February 2015 to assess the prevalence of cardiovascular diseases and its risk factors among adults of 18 years and older living in Dhulikhel, a sub-urban town in Nepal.[14]

Participants

We conducted four focus group discussions (FGD) with 22 DHS participants. We used FGDs for community members as this method is proven to adequately gather information on the

perception of obesity among adults in LMICs.[8,15] Participants were selected using purposeful sampling methods. A list of DHS participants was obtained and stratified into four groups by gender (male and female) and age (<40years and ≥40years). The separation of gender was necessary because women in Nepalese culture are usually shy and do not discuss explicitly in presence of men. The researcher contacted 12 eligible participants from each group via phone call to request participation in the study. Participants who provided verbal consent were invited for discussions. Of the total 48 eligible participants who agreed to participate, 22 took part in the group discussions. Six participants who initially agreed to participate did not attend the discussion. Altogether 26 eligible participants did not participate in the study. The reasons for non-participation were busy schedules on the given time and date and medical illness.

For the in-depth interview (IDI), we purposefully selected four health providers (HPs) from different healthcare levels to explore barriers to obesity management. We selected one doctor and a nutritionist from the tertiary hospital, an in-charge from a primary health care center, and an in-charge from an urban health care center. All HCPs who were invited agreed to participate in the study and were interviewed.

Data collection

We collected data from October 2016 to December 2016. We developed initial guidelines in Nepali. The FGD guideline was pilot tested among 6 DHS participants, and the IDI guideline was pre-tested with a doctor in the tertiary hospital. The guidelines were then reviewed and modified accordingly. The findings from the pre-tested FGD and IDI were not included in this analysis.

All FGDs were moderated by the researcher and assisted by a note-taker. The moderator was not from the study community and, hence had no prior knowledge about the participants

before the study. The moderator started each session by briefly explaining the aim of the study and receiving informed consent. Participants' height and weight were also measured before the discussion commenced. The moderator started the discussion with open-ended questions and probed further for in-depth information. The FGD guideline included 10-item questions under four topics– body size perception; knowledge on obesity; attitude towards obesity; and barriers to weight management. For the perception of body size, we asked participants' views on their body size, and then probed why they think their body is normal or overweight or obese and how they measure their body size. To explore participants' knowledge of obesity, we asked questions on the perceived cause and complications of obesity and further probed if certain groups in the community are perceived as more obese than others. On attitude towards obesity, we asked the following questions, 'How do you view overweight and obesity?', and 'What influences society's views on obesity?' Regarding the willingness to lose weight or maintain optimally, we asked about the perceived barriers to weight management. We conducted FGDs in a private space at a community building. The group size varied from 3 to 7. FGD participants were offered a light snack for their time and participation.

The investigator (SA) conducted IDIs with HCPs in the private room at their respective health care centers. Informed consent was received before each interview. The IDIs were conducted to understand the burden of obesity in the community, providers' perspectives on the community's knowledge and attitude on obesity, and providers' related barriers to obesity management. The questions included 'What percentage of patients attending to your institution are overweight or obese?', 'In general, how well do you think patients understand overweight and obesity?', 'How do community members view/perceive obesity?', 'Are there any common misconceptions in the community about obesity?', and 'What factors affect

obesity management?' The moderator further probed on the above questions to explore further information.

Data analysis

FGDs and IDIs were recorded and transcribed verbatim in Nepali. SS transcribed all recorded data. Data were analysed using the hybrid thematic analysis approach.[21] We started with an "a priori" list of codes drawn from the literature review and research questions and included additional codes that emerged during the inductive analysis process.[22] One FGD and two interview transcripts were coded separately by two independent coders (SS and SA) to enhance the data validity. Coders discussed similarities and differences in the way codes were applied and agreed on the emerging codes. The interconnected codes were then grouped into sub-groups and sub-groups were further grouped into broad themes. After the discussion, the final codebook was updated. SS further analysed the transcripts and grouped text units as per the codes using the Atlas ti.7. Selected quotes were reported.

Ethics statement

All participants who gave verbal consent to participate in the study also signed an informed consent form. Participation in the study was voluntary. All collected data were kept safe and strictly confidential.

Patient and public involvement

The study design and objectives were informed by previous findings from the DHS study, which indicated the high prevalence of obesity and poor cardiovascular health literacy among the community members. Although we did not specifically do separate community engagement for this study, we did include the discussions in the planning of the DHS in several community activities at schools, wards, meetings with female community health volunteers, and other local community clubs.

RESULTS

Characteristics of participants

The characteristics of the FGD participants are presented in table 1.

Table 1: Socio-demographic characteristics of FGD participants

Characteristics	Participants (n=22) n (%)
Age group	
20-39	10 (45.5)
40-59	10 (45.5)
>60	2 (9.0)
Gender	
Male	10 (45.5)
Female	12 (54.5)
Ethnicity	
Newar	25 (71.4)
Brahmin	5 (14.3)
Tamang	4 (11.4)
Marital status	
Married	15 (68.2)
Not married	6 (27.3)
Widow	1 (4.5)
Education	
No formal education	3 (13.6)
Primary level education	2 (9.1)
Secondary level	6 (27.3)
High school or more	9 (40.9)
Occupation	
Employed	3 (13.6)
Self-employed*	9 (40.9)
Homemakers	4 (18.2)
Unemployed	2 (9.1)
Student	4 (18.2)
BMI	
<25kg/m^2	9 (40.9%)
≥25-29kg/m^2	6 (27.3%)
≥30kg/m^2	7 (31.8%)

*Self-employed includes business and agriculture

We categorized themes derived from FGDs and IDIs into five categories: (1) Burden of obesity; (2) Knowledge of obesity; (3) Attitude towards obesity; (4) Body size perception; and, (5) Barriers to obesity management. The example of coding, categorizing, and formulating themes is given in table 2.

Table 2: Example of coding, categorizing, and formulating themes

Codes	Definition of codes	Sub-category	Category	Theme
Busy Schedule	Any reference to discontinuing or not initiating exercise due to the patient's lack of time.	Exercise habit	Challenges in behaviour modification	Barriers to weight management
Laziness	Any reference to discontinuing or not initiating exercise due to the patient's laziness.			
Co-morbidities	Any reference to discontinuing or not initiating exercise due to the patient's existing disease/condition.			
Weather	Any reference to discontinuing or not initiating exercise due to weather conditions.			
Lack of physical facilities	Any reference to discontinuing or not initiating exercise due to lack of physical facilities and/or adequate space to exercise.			
Food taste	Any reference to the difficulty in modifying dietary habits due to food taste.	Food habit		
Desire to eat	Any reference to the difficulty in modifying dietary habits due to the patient's desire to eat what they see.			
Junk food	Any reference to the difficulty in modifying dietary habits due to easy availability and accessibility of junk food.			
Lack of access to healthy food	Any reference to the difficulty in modifying dietary habits due to the inaccessibility of healthy food.			

Burden of obesity

Both FGD participants and HCPs identified obesity as a growing problem in the community. A medical officer stated that among the 20-25 patients he examines in a day, 7-8 of them are either overweight or obese. He further commented that while obesity might be increasing among teenagers, these teenagers are not under their radar as they seldom visit doctors. Obesity was found to be higher among females and individuals aged 40 years and over in the community. Participants also pointed out that obesity is high among particular ethnic groups, such as Newar and Tamang, and among other sub-groups such as married persons, office workers, housewives, businessmen, drivers, rich people, and people living in urban areas.

> *"In Newari culture, there are a lot of feasts and festivals, so they eat a lot. In the case of Tamang, they drink (alcohol) a lot. They eat much while drinking. Both are high in calories, so this might result in weight gain."* (Nutritionist)

Awareness of obesity

Causes of obesity

All FGD participants believed that obesity could result from an unhealthy diet (e.g., oily and fatty food), lack of exercise, and sedentary lifestyles. Few mentioned heredity or old age as causes of overweight. Participants aged 40 and over reported they gained weight without any specific reasons while maintaining their diet.

> *"In my case, I eat chapatti in the evening and rice in the morning. Still, my belly does not get decreased. In the past, despite my massive eating, I did not gain weight. Now, even drinking water leads to weight gain."*(Male, above 40)

> *"For some, it looks like genetics. Their grandparents are fat and so are the grandchildren."* (Female, above 40)

Female participants further added the reasons for being obese, such as the use of family planning devices, an increase in food intake after childbirth, and the habit of eating leftovers to prevent food waste.

> *"(I) was told to eat more during my childbirth. Everyone used to say that I need more than before. So, the amount of my food increased. I used to eat less before (giggles)"* (Female, above 40yrs.)

> *"It's like, someone leaves the food, and instead of throwing, I feel like [I] should eat it. Why throw (food)? So, I gained weight."* (Female, above 40yrs.)

Complications of obesity

Musculoskeletal problems, such as difficulty sitting and walking, back pain, and pressure on the heel due to overweight were the predominant complications reported by participants. Many also reported high blood pressures, while few mentioned diabetes, high cholesterol, and heart disease as complications. Participants' knowledge of complications was not only based on their experience but also on what they had seen in their family and community. Participants who had overweight were more concerned about complications, in terms of both their health and appearance, than those with a normal weight. Male participants under the age of 40 years were more concerned about their health and appearance due to overweight. One overweight male participant under 40 years stated he was ashamed of walking with his friends, and added:

> *"As per my experience, it is better to lose weight than to gain it. […] Once I had an experience of being overweight. It was difficult. It's like I had Asthma [disease]. I could not walk." (Male, under 40yrs.)*

> *"Our body shape looks bad. […] (We) look older ata younger age because of obesity.* (Male, under 40yrs.)

HCPs, however, commented that people do not take obesity seriously because they lack adequate knowledge about its complications. Once HCP said:

> *"Until and unless the disease does not get complicated, it barely comes to their mind that they should go for a check-up. Otherwise, they don't even give a try to reduce weight although they are asked to do so."* (Medical Officer)

Participants who feared the health consequences of obesity usually ask the HPs for suggestions to reduce weight. However, one HCP emphasized that the reason for being concerned is the appearance rather than disease.

> *"I see these days that people are concerned with obesity not because of disease but because of how they look physically. There are very few who [are] concerned about disease."* (Medical Officer)

Attitude towards obesity and overweight

FGD participants reported that overweight was considered good in society, both health-wise and appearance-wise. Some participants under 40 years also expressed their willingness to increase weight. One female participant described how odd it was to have a thin figure in her family:

> *"...we are five daughters-in-law in the family...it looks odd when there is one thin person in the room...it does not match in the family."* (Female, under 40yrs.)

For women, gaining weight after marriage was viewed positively.

> *"If I lose my weight and visit there [maternal home], they [neighbors] would say that my husband did not provide me enough to eat [giggles]. If I go with my increased weight, they will say that my husband loves me."* (Female, under 40yrs.)

However, participants also believed that too much weight gain (obesity) was perceived as bad in the community and that community perception/attitude towards obesity has been changing. Particpants attributed this change to the information provided through media, such as television and radio, and to increasing obesity-related disease prevalence in the community.

> *"...My mother-in-law used to say that if she saw any handsome and healthy person then she thought that the person belongs to high economic class. [...] She says it is good. However, nowadays, her view has changed. Now she says that it is not good to gain weight, and excess weight results in disease.* (Female, under 40yrs.)

Most participants expressed a positive attitude towards thinness and expressed their willingness to lose weight. Those who had already faced problems or are currently facing

problems due to obesity/overweight, both disease-and appearance-wise, did not want to increase their weight despite comments from their family and.

> *"If we, the overweight people, lose weight, we get comments (from others) like- what happened, what disease you suffered from, are you stressed, and all. But we have to take care of our own body although people comment."* (Female, above 40yrs.)

HCPs also mentioned the low self-esteem and psychological stress they found among obese people, especially in teenagers, because of negative comments that people make about them.

> *"It's like okay if someone [obese individuals] can take it easy when they are called fat ["Mote"]. Otherwise, what I also have seen among teenagers age 16-17 years is that they do not participate in dance [competitions]. They do not participate in game competitions because they think people will stare at them and flatter them. Such cases come often.* (Nutritionist)

HCPs commented that though excessive weight (obesity) and thinness are considered bad in the community, overweight is still considered good. This concept is hard to change among people, even in educated people when it comes to children. The provider described saying,

> *"(I have seen) a woman with a lean child. She cried after seeing another chubby baby by her side grieving what had happened to her children. That was a difficult time for me [to counsel her]."* (Nutritionist)

Body size perception

Before carrying out the discussion, we measured the height and weight of each FGD participant. All participants aged 40 and above were found to be either obese or overweight. Nevertheless, when asked what they feel about body size, the majority of them perceived that their weight was normal.

> *"It would be good if I could decrease my belly size. Otherwise, I feel like I am normal."* (Male, under 40yrs.)

The majority of participants under 40 years had normal weight. Two participants, one male and one female, considered themselves overweight although their measurement indicated normal weight.

Most participants perceived their body size and weight by measuring their clothes' size, evaluating themselves in mirrors, and experiencing others' comments about their body, while only a few male participants reported measuring their weight on a scale, when possible. However, HCPs reported that the number of people who are aware of and/or interested in measuring their weight is increasing in the community. As one said,

> *"If we remember those people who measured their weight, the count will be double than our patients." (Auxiliary Health Worker)*

Barriers to weight management

Challenges in behaviour modification

Physical activity

All FGD participants mentioned that diet modification and exercise are keys to prevent and control obesity. However, only a few of the participants reported exercising to maintain or reduce their weight. Both overweight or obese and normal-weight participants reported similar barriers to weight management. The most commonly reported barriers were busy schedule and laziness followed by cold weather and lack of space or physical facilities for exercise. Participants above 40 years of age reported that comorbidities such as musculoskeletal pain limits their level of physical activity.

> *"I cannot go [for exercise]. Otherwise, I want to walk. It is difficult for me to walk, my leg aches".* (Female, above 40yrs.)

> *"I don't have friends to walk together with. Here is no place for Yoga. […]. I also need to manage time at home"* (Female, under 40yrs.)

Two female participants under 40 years of age reported that they feel normal, and thus do not feel a need to exercise.

> *"We will exercise if we need to. Otherwise, it (the life) is going on. So, I feel- why should I exercise?"* (Female, under 40yrs.)

Participants had a diverse opinion on the adequate level of physical activity. A Few believed that household chores like cooking and washing clothes were adequate for exercise, while others thought that exercise was only adequate when they sweat. Participants' required duration of exercise ranged from 10 minutes to 3 hours a day.

Effect of challenging food environment and diet behaviour

The most frequently reported barrier for diet control was difficulty in changing food habits due to food taste and desire to eat. Participants also mentioned the unavailability of healthy food due to the use of excessive pesticides in vegetables and fruits. In addition, participants' reported that the increased availability and efficiency of consuming junk food has limited their consumption of healthier food. Consuming junk food was also a status symbol. One participant explained that people in the community eat junk food to show that they belong to a higher social status.

> *"If our children walk taking the juice bottles and drinking juices, then that reflects a higher status. But, if they walk eating homemade popcorn, then that reflects the lower status.* (Male, under 40yrs.)

Lack of HCP's knowledge and anthropometric measurement tools

HCPs reported that overweight and obesity were identified by measuring a patient's weight and height, by observation, and by the patient's complaint. When asked specifically about measuring central obesity, the HCPs at the tertiary level stated that they measure waist circumference only for those who are diabetic or have a metabolic syndrome. However, the HCPs at the peripheral level were not aware of measuring central obesity. One put it this way-

> *"We have not done that (measured central obesity). We do not have an instrument. We also do not have such information. If we were given an instrument and the District Health Office directed us to do so or if we were given any training…we do everything based on our knowledge. We do not have anything extra."* (Auxiliary Health Worker)

Lack of counseling

HCPs at the peripheral level counsel to patients for 7 mins to half an hour depending upon the patient's condition and the provider's available time. At the tertiary leve, the Nutritionist spends around half an hour to 45 minutes in counseling. However, the medical officer at the tertiary level could only provide a maximum of 5 minutes for counseling because of their time constraints and high daily patient volume. The medical officer mentioned that it would be helpful if they had additional assistance.

> *"Yes, I think it's a time factor (for not counseling patients). And another, I think it is helpful if we get a helping hand. One will take a note when one measure (weight), it expedites the process."* (Medical Officer)

Discussion

This study explored the perception of obesity and overweight among Nepalese adults living in a suburban community. We found that participants had inadequate knowledge and misconceptions regarding obesity and had perceived overweight as normal, healthy, and attractive. The adults above 40 years of age did not perceive themselves to be overweight or obese even when they were. Only a few participants reported exercising and controlling their diet to prevent obesity or manage their weight.

Obesity was perceived as a growing problem in the Dhulikhel community. A 2016 cross-sectional study by Shrestha et. al reported the prevalence of overweight and obesity among DHS participants of 18 years and older were as 28.4% and 8.1%, respectively.[9] Similarly, the nationally conducted WHO STEPS survey in 2019 reported the prevalence of overweight and obesity among Nepalese adults aged 15-45 years as 20% and 4.3%, respectively.[6] In our study, participants reported that obesity was mainly a problem among individuals who are 40 years of age and above, married persons, office workers, businessmen, retired individuals, and housewives. A 2011 study among civil servants in Nepal reported that married

participants were 7.5 times more likely to be overweight/obese than non-married.[18] Additionally, the occupation was found to be related to being overweight/obese. Based on the above findings, it is important to design interventional programmes targeting these populations to prevent overweight and obesity.

Participants mainly linked the causes of obesity to personal factors, such as fatty diet and physical inactivity, which is similar to other studies conducted in Nepal, India, Malaysia, South Africa, and Morocco.[8,17,18,23,24] Few of our participants reported heredity as a cause of obesity. This contrasts with the result from the previous study done among civil servants in Nepal, which found that an almost equal number of participants viewed "fatty foods" or "a genetic disorder" as a cause of obesity.[18] In addition to personal factors, women in our study stressed social and medical factors such as marriage, childbirth, the habit of eating left-overs, and the use of contraceptives as causes of obesity and overweight among females. In Nepalese society, gaining weight right after marriage is considered a good sign of a healthy relationship with a husband and in-laws. Culturally, Nepalese prefers to finish the food on the day that is cooked. As women are the last members of a household to eat, they are expected to consume all remaining food. Additionally, women's increased food consumption after childbirth is believed to increase milk production and improved milk quality, and the well-being of both mother and child. Findings from the study conducted in the Laayoun community of Morocco also reported socio-cultural pressure as a factor for increasing weight among females.[16] In contrast to our study, this study reported that single females also desired to gain weight to maintain an ideal cultural beauty. It is important to educate females of reproductive age about obesity risks to promote a healthier lifestyle.

Health and appearance are the key motives to lose weight.[25,26] Similar to findings from previous studies in South Africa and Morocco, participants in our study who were concerned about the consequences of obesity and their appearance were more willing to lose or

maintain their current weight.[8,27] However, it is important to consider if people are only concerned with their appearance because the weight loss for a transient period to appear fit and attractive, such as in social events, will not be sustainable, and the attempt to lose a lot of weight in a short duration of time can be hazardous.

In our study, almost all participants who were 40 years and older underestimated their body weight, though they all met the criteria of overweight and obese. This finding is similar to studies conducted in Tanzania, Cameroon, and in the United States.[11,23,27] Additionally, studies have also reported variation in weight estimation by gender and age.[8,28] A qualitative study in South Africa reported that the majority of overweight and obese female participants perceived themselves to be normal or moderately overweight, and chose the silhouettes that were smaller than their body size.[8] A cross-sectional study in Morocco reported that more females than males underestimated their body weight and males 40 years of age and above were more likely to underestimate their weight compared to females in the same age group.[27] Individuals who do not perceive themselves as overweight and obese are likely to gain more weight due to their low-risk perception and unwillingness to lose weight.[8,11,12] The inability for our participants to accurately recognize their body-weight status may prevent them from adopting healthy behaviours and increase their risk to obesity and its complications. Therefore, the community should be made aware of the importance of measuring their weight at intervals, and health facilities should also increase educational campaigns to improve community awareness.

In Nepal, a big belly is culturally accepted as a sign of prosperity.[7,18] Participants' perception that overweight is considered good, healthy, and attractive is consistent with other studies conducted in South Africa, Morocco, and the United States.[8,23,27] Most strikingly, this was frequently reported by females under 40 years of age. Research has shown that females may be more accepting of obesity than men, and thus have a less negative attitude

towards obese individuals.[29] However, further studies on the role of gender in weight-related acceptance are needed.

Although overweight is acceptable, participants have a negative attitude towards an obese person. This reflects the finding of several other studies,[8,15,23,30] whereby obese individuals are viewed as lazy, heavy, unattractive, and are perceived to have illnesses associated with obesity. Studies have also shown the consequences of others' negative attitudes among obese persons.[8,15,18,23,30] For example, a study in Cameroon reported that overweight Caucasian and African American women were viewed differently and were discriminated against despite their hard work.[23] Such internalized stigma among obese individuals is particularly from the belief that obesity is a result of an individual's failure to maintain a healthy lifestyle.[15] Considering the fact that participants in our study primarily pointed out the internal factors such as diet and exercise, as causes of obesity, it is important to make people aware of socio-cultural and medical factors to reduce obesity-related stigma and negative attitude.[15] Further studies to explore the impact of negative attitudes on overweight or obese individuals in Nepal would be beneficial to develop interventional programmes in this setting.

Adequate exercise and a healthy diet are keys to managing obesity and other chronic diseases.[31] Although participants in our study were aware that a healthy lifestyle will benefit them, they did not implement it. This difference in knowledge and practice has been described in many studies.[8,32–34] This could be due to low awareness of obesity complications. In our study, both the overweight and normal-weight participants reported similar barriers to weight management. This could be because only a few participants in our study reported exercising or controlling a diet to reduce or prevent obesity. Moreover, participants who were overweight did not perceive themselves as overweight and did not feel the need to change their behaviour. The cultural acceptance of overweight in Nepalese culture

and the difficulties in modifying behaviour could be a challenge to implementing the effective intervention programme in this setting.

The surrounding environment influences our food choices and eating behaviour.[35] Studies have shown a positive relationship between easy access to fast food and its high consumption, leading to obesity and other cardiovascular diseases.[36,37] Participants in our study also reported the increased availability of junk food as a cause of obesity. Interestingly, few participants in our study related junk food with a higher social status. This might be due to the influence of appealing advertisements and the increasing adoption of western food, such as fries and chips in Nepal. A study conducted among school children in urban Nepal reported that children belonging to families with higher income were 1.7 times more likely to consume junk food than those belonging to families with lower income.[38] Whereas, few other studies on school children showed no relationship between family income and junk food consumption.[39,40] In addition, a cross-sectional study conducted among the DHS participants in 2016 reported no association between income status and fast food consumption.[41] Therefore, further studies exploring the relationship between socioeconomic status and junk food consumption are warranted in Nepal. In addition to junk food, our study participants also reported the use of pesticides in food as a barrier to healthy eating. In Nepal, pesticides are widely used in agriculture, especially in vegetable cropping. The pesticides formulation and import increased by more than 6-fold between 1997/1998 and 2011/2012.[42] Kavrepalanchok, the district of Dhulikhel, is one of the highest pesticide user districts in Nepal.[43] A study conducted among potato growers in kavrepalanchok reported that approximately 94% of potato growers apply pesticides in potatoes.[44] A qualitative study conducted among cafeteria managers in Dhulikhel Hospital reported the unavailability of healthy food in a local market as an obstacle to consuming healthy food in cafeterias.[20] Most of the studies in Nepal are so far concentrated on modifying individual behaviours to

prevent obesity. However, the above findings suggest that we need to direct our focus on the broader level, addressing the challenges associated with the food environment.

As in other low and middle-income countries, obesity is primarily assessed based on BMI in Nepal.[15,45,46] However, BMI cannot differentiate between weight because of excessive muscle percentage and body fat proportions.[15] Studies have shown that people with normal BMI are at risk of cardiovascular diseases because of central obesity.[15,45,46] The prevalence of central obesity has been increasing among South Asians. A 2006 study in Nepal reported a higher prevalence of central obesity than general obesity among the study population in Dharan.[47] Similarly, a study in China reported that the prevalence of central obesity among adults with BMI <25kg/m^2 increased by almost two-fold from 11.9% in 1993 to 21.1% in 2009.[46] If the study did not consider measuring WC for obesity, they would have missed 65% of the cases. This highlights the importance of measuring WC to accurately measure obesity in clinical settings.

This study is the first qualitative study in Nepal that aimed to understand the perception of obesity among adults in a sub-urban community from both community and healthcare providers' perspectives. The use of open-ended questions provided insights into participants' perspectives and lived experiences. However, several limitations exist. This study is confined to the sub-urban area; therefore, the perception of urban and rural areas is underrepresented. However, a qualitative study is intended to understand a phenomenon, and not to analyse the relationship between variables.[33,48] All the FGD participants belonged to the Hindu religion; therefore, the study could not explore the perception of individuals of other religions. However, the majority of the population in this area are Hindu. Although few numbers of health providers were interviewed in this study, we have considered to include them from the different health care levels. Given these limitations, however, the study provides profound information on the community's perception of obesity in Nepal.

Conclusions

This qualitative study explored the knowledge, attitude, and perception of obesity among Nepalese adults in a suburban community. Given the participants' misconception and inadequate knowledge regarding obesity, and the underestimation of their body size, it is suggested to design and disseminate culturally appropriate health information to manage obesity in the community. Also, it is essential to consider challenges associated with food environment while designing health intervention. Our finding shows that the healthcare providers at the peripheral health institutions lack training and instrument to measure central obesity. Since the prevalence of central obesity is rising in South Asians, including the Nepalese population, it is important to consider central obesity while training health workers at the peripheral level.

List of abbreviations

BMI: Body Mass Index

FGD: Focus Group Discussion

HCP: Healthcare Provider

IDI: In-depth Interview

STEPS: STEPwise approach to surveillance

WHO: World Health Organization

Declarations

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Author contributions

SS, the principal investigator, conceived the study, transcribed and analysed data, and developed the manuscript. BMK and RK contributed to the research design. SA contributed to collecting and analysing the data. SSu contributed to revising the manuscript. All authors read and approved the final manuscript for publication.

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Competing interests

None declared

Patient consent for publication

Not required.

Ethics approval

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Provenance and peer review

Not commissioned, externally peer reviewed.

Data availability statement

No data are available.

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Standards for Reporting Qualitative Research (SRQR)[a]

No. Topic	Item	Page/ line no(s).
Title and abstract		
S1 Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
S2 Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions	2
Introduction		
S3 Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
S4 Purpose or research question	Purpose of the study and specific objectives or questions	4
Methods		
S5 Qualitative approach and research paradigm[b]	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended	5
S6 Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability	6
S7 Context[b]	Setting/site and salient contextual factors; rationale[a]	5
S8 Sampling strategy[b]	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale[a]	5
S9 Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	20
S10 Data collection methods[b]	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale[a]	5-6
S11 Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5-6

S12 Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-6, 7-8
S13 Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts	6
S14 Data analysis[b]	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale[a]	6,8-9
S15 Techniques to enhance trustworthiness[b]	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale[a]	6
Results/Findings		
S16 Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	7-15
S17 Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	9-15
Discussion		
S18 Integration with prior work, implications, transferability, and contribution(s) to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	15-18
S19 Limitations	Trustworthiness and limitations of findings	18
Other		
S20 Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	20
S21 Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	19

[a]The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

[b]The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference: O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Academic Medicine, Vol. 89, No. 9 / Sept 2014 DOI: 10.1097/ACM.0000000000000388